8.6 Public Health

This section presents the methodology and results of a screening human health risk assessment performed to assess potential impacts and public exposure associated with airborne emissions from the construction and operation of the South Bay Replacement Project (SBRP). Section 8.6.1 introduces the subject of public health impact analysis for a power plant proposed in a California Energy Commission (CEC) Application for Certification (AFC). Section 8.6.2 describes the laws, ordinances, regulations and standards relevant to potential public health impacts of such a project. Section 8.6.3 describes the potentially affected public health environment around the proposed project site. Section 8.6.4 discusses the environmental impacts from construction and operation of the power plant and associated facilities, and demolition of the existing South Bay Power Plant (SBPP). The calculations of non-criteria pollutant emissions and the air dispersion modeling for the screening health risk assessment are presented in Section 8.1, Air Quality and Appendix 8.1E.

This public health section also describes project design features that keep potential impacts below public health-related thresholds of significance (e.g., the sole use of clean-burning natural gas in the SBRP). This clean fuel, along with other design and operating aspects will ensure that the public health impacts of the SBRP will be below the level of significance. As discussed in Section 8.12, Hazardous Materials Handling, multiple design features will be implemented in the Project to assure that potential public health impacts of a hypothetical accidental release of aqueous ammonia will also be kept below a level of public health-related significance. Section 8.6.5 discusses mitigation measures as may be needed to reduce potentially significant impacts below a level of significance. Section 8.6.6 contains references cited or consulted in preparing this section.

The SBRP project consists of three phases:

- **The Construction Phase**—The first phase is the demolition of existing structures and foundations associated with the former Liquefied Natural Gas (LNG) Facility, preparation of construction lay down areas, and the construction of the SBRP. Initial operations of SBRP will include an interim interconnection to the San Diego Gas & Electric Company (SDG&E) transmission system through a new 230-kilovolt ampere (kVA) substation on approximately 0.6 acre (interconnecting to SDG&E's planned new 230-kilovolt (kV) transmission line) and an underground interconnection to the existing SDG&E South Bay 138/69 kV substation.[1]

- **The Demolition Phase**—The second phase of Project construction activities will occur after the SBRP achieves commercial operation. The construction activity during this phase will be the demolition of the existing SBPP facilities, excluding SDG&E's existing South Bay Substation which will remain in service until the new substation is constructed.

[1] SDG&E was granted a Certificate of Public Convenience and Necessity (CPCN) for the Otay Mesa Power Purchase Agreement (OMPPA) Transmission Project. The CPCN is for the construction of two new 230-kV electric transmission circuits to connect SDG&E's Miguel Substation with both the Sycamore Canyon Substation and the Old Town Substation in San Diego County. The circuit to the Old Town Substation is planned to pass within approximately 100 feet of the proposed SBRP. This project is under construction. The SBRP interconnection plan is based in part on interconnecting to this circuit.

- **The New Substation Phase**—The final phase of the Project will involve the construction of the SDG&E substation on approximately 6.5 acres south of and adjacent to the SBRP site. This construction will be performed after the start up of the SBRP and demolition of SBPP. After the new SDG&E substation construction is completed and operational, and the SBRP generator leads are attached to the new facilities, SDG&E could then initiate demolition activities on the South Bay Substation, located north of the SBRP Project site. These demolition activities, however, are not part of the scope of this Application for Certification (AFC). They are part of a separate project of unknown timing and scope.

The reason there are two interconnect steps is to assure that interconnection can be secured by the proposed SBRP on-line date of 2010. Also SDG&E holds certain obligations associated with a new substation as part of its Memorandum of Understanding with the City of Chula Vista, but these obligations occur after the demolition of the South Bay Power Plant (SBPP).

8.6.1 Introduction

Air will be the dominant pathway for potential public exposure to non-criteria pollutants released by the Project. Emissions to the air will consist primarily of combustion by-products produced by the combined cycle units, auxiliary boiler, and emergency fire pump engine. Potential health risks from combustion emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways for dermal absorption, soil ingestion, and mother's milk ingestion were included in the health risk modeling; however, direct inhalation is the dominant exposure pathway. The screening health risk assessment methodology was conducted in accordance with guidance established by the California Office of Environmental Health Hazard Assessment (OEHHA)[2] the California Air Resources Board (ARB)[3], and the SDAPCD[4].

The Project will use combined-cycle technology to minimize emissions of pollutants per unit electric energy generated, and use an optimized stack height to reduce ground-level concentrations of the emissions, thus reducing potential effects on public health.

It is beyond the scope of this analysis to describe the public health benefits that derive from the generated electric power that is provided to homes, businesses, hospitals and other societal institutions.

Combustion byproducts with established national and California ambient air quality standards (referred to as "criteria pollutants") are addressed in Section 8.1, Air Quality. However, some discussion of the potential health risks associated with these substances is presented in this section. Human health risks potentially associated with accidental releases of stored hazardous materials at the proposed facility (aqueous ammonia) are discussed in Section 8.12.

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[2] OEHHA. Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, April 2005.

[3] ARB. Consolidated Table of OEHHA/ARB-Approved Risk Assessment Health Values, April 25, 2005, http://www.arb.ca.gov/toxics/healthval/healthval.htm, last updated June 7, 2005, accessed March 19, 2006.

[4] SDAPCD. Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs), March 2005.

8.6.2 Laws, Ordinances, Regulations and Standards

Among the local LORS discussed in this section are certain ordinances, plans or policies of the City of Chula Vista. For informational purposes, this section reviews compliance of the Project with such requirements even though the Applicant understands that they are not applicable to the Project as a matter of law. (*See* Section 8.4 — Land Use for a discussion of this issue.) The analysis of City LORS in this section is informational and does not address the jurisdictional issues which are discussed in Section 8.4 — Land Use.

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to this project are identified in Table 8.6-1. The compliance of the Project to each of the LORS applicable to public health is also presented in this table.

TABLE 8.6-1
Laws, Ordinances, Regulations, and Standards

LORS	Public Health Concern	Primary Regulatory Agency	Project Compliance
Clean Air Act	Public exposure to air pollutants	USEPA Region 9 CARB SDAPCD	Based on acceptable risks, computed in a health risk assessment that follows CARB/OEHHA and SDAPCD guidelines, the Project emission rates of non-criteria pollutants are acceptable. Emissions of criteria pollutants will be minimized by applying BACT to the facility, resulting in project ambient levels that would not exceed primary ambient air quality standards, which have been established to protect public health.
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on a health risk assessment that follows CARB/OEHHA and SDAPCD guidelines, non-criteria pollutant emission rates and resulting doses and carcinogenic risks will not exceed thresholds that require Proposition 65 exposure warnings.
40 CFR Part 68 (Risk Management Plan)	Public exposure to acutely hazardous materials	USEPA Region 9 San Diego County Department of Environmental Health	As discussed in AFC Section 8.12 (Hazardous Materials Handling), an offsite consequence analysis has been performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank. A Risk Management Plan (RMP) will be prepared prior to commencement of facility operations.

TABLE 8.6-1
Laws, Ordinances, Regulations, and Standards

LORS	Public Health Concern	Primary Regulatory Agency	Project Compliance
Health and Safety Code, Article 2, Chapter 6.95, Sections 25531 to 25541; CCR Title 19 (Public Safety), Division 2 (Office of Emergency Services), Chapter 4.5 (California Accidental Release Prevention Program)	Public exposure to regulated substances	San Diego County Department of Environmental Health	As discussed in AFC Section 8.12 (Hazardous Materials Handling), an offsite consequence analysis has been performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank. A Risk Management Plan (RMP) will be prepared prior to commencement of facility operations.
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act— AB 2588)	Public exposure to toxic air contaminants	SDAPCD CARB	Based on the non-criteria pollutant emission inventory for the existing SBPP and proposed for the SBRP, and previous health risk assessments per CARB/OEHHA guidelines, toxic contaminants will not exceed acceptable levels.
SDAPCD Regulation XII – Toxic Air Contaminants, Rule 1200 - Toxic Air Contaminants New Source Review	Public exposure to toxic air contaminants	SDAPCD	The project screening health risk assessment confirms that project design features and application of Toxics-BACT will assure that potential health risks are less than Rule 1200 thresholds.
Chula Vista General Plan Objective E 6, Policy E 6.4 (potentially-applicable local LORS)	Public exposure to toxic air contaminants	The Project is not located within the jurisdiction of the City of Chula Vista, but the policy concern about potential public exposure to toxic air contaminants is addressed by the AFC's health risk assessment required by the CEC.	Although the project's location on Port of San Diego land is not directly subject to the City of Chula Vista General Plan and the Project is not a major toxic emitter by the definition of a major source, the project CTG emission sources are located approximately 1,370 feet from the nearest residential receptor, which is more distant than the policy recommendation of 1,000 feet. The Diesel-fueled fire water pump engine is located approximately 1,090 feet from the same (nearest residential) receptor, which is more distant than the policy recommendation of 1,000 feet. It is expected that the Port of San Diego will assure through the Chula Vista Bay Front Master Plan that new residences or other "sensitive receivers" will be located further than 1,000 feet from these same project emission sources.

TABLE 8.6-1
Laws, Ordinances, Regulations, and Standards

LORS	Public Health Concern	Primary Regulatory Agency	Project Compliance
Chula Vista General Plan Objective E 6, Policy E 6.5 (potentially applicable local LORS)	Improve local air quality	CEC, on behalf of the City of Chula Vista	Although the project's location on Port of San Diego land is not directly subject to the City of Chula Vista General Plan, the Project will improve local air quality by emitting less NOx, CO, VOC, PM_{10}, ozone precursors and PM_{10} precursors than the SBPP during its 2004-2005 baseline period. The Project will be a lesser-polluting strategy for energy because it will produce substantially lower emissions of ozone precursors or PM_{10} precursors as the existing SBPP per unit of electricity produced.
Chula Vista General Plan Objective E 6, Policy E 6.10 (potentially applicable local LORS)	Public exposure to toxic air contaminants	Not applicable	Not applicable.
Chula Vista General Plan Objective E 23, Policies E 23.1 and 23.3 (potentially applicable local LORS)	Environmental justice	CEC, on behalf of the City of Chula Vista	See discussion in Section 8.8, Socioeconomics.

8.6.3 Affected Environment

Because health risks from operation of the SBRP will be below public health significance criteria thresholds, no residential, workplace or sensitive receptors will be impacted. Sensitive receptors are locations where groups of individuals, including infants, children, the elderly and chronically ill, that may be more susceptible than the general population to health risks from air pollution may be found. Schools, day-care facilities, convalescent homes and hospitals are of particular concern. In accordance with CEC guidance (Ringer, 1999), a search was conducted for sensitive receptors within 3 miles of the Project. Daycare, hospital, park, preschool, and school receptors found within 3 miles are listed in Appendix 8.6A, Tables 8.6A-1 through 8.6A-4 with their Universal Transverse Mercator (UTM) coordinates and shown in Appendix 8.6A, Figures 8.6A-1 through 8.6A-4. The combined set of all sensitive receptors are shown on Figure 8.6-2. The figure shows no public health impacts because indices of carcinogenic risk and chronic and acute health hazards are less than significant at and beyond the Project boundary (see Section 8.6-4).

The nearest residence to the Project is a mobile home located on the Interstate 5 boundary (west) of Brentwood Park, which is located along the west side of Industrial Boulevard between Naples and Moss Streets in the City of Chula Vista. The mobile home is approximately one-quarter of a mile (417 meters or 1,370 feet) to the east of the Project's main emission sources or 775 feet east of the Project's east property boundary (see Figure 8.6-1).

The area within 10 miles of the Project is shown as the circle in Figure 8.6-3. The terrain within this 10-mile radius area is shown in the USGS quadrangle maps in Appendix 8.6B, and the orientation of the quadrangle maps with respect to the Project is shown in Figure 8.6-3. Five copies of the topographic maps at a scale of 1 to 24,000 are provided under a separate cover. This 10-mile distance satisfies the CEC list for information required in a "data adequate" submittal, but is unrelated to the actual distance of potential public health impacts from the Project property line.

Beneficial aspects of the Project regarding protection of public health include the following:

- Limiting the overall capacity of the facility to a nominal 500 MW, and limiting the overall emissions potential from supplemental duct firing.
- Use of clean-burning natural gas fuel.
- Low-sulfur content of the natural gas, which reduces sulfate fine particulate generation.
- Advanced combined-cycle combustion gas turbine technology to minimize the amount of fuel needed to produce electricity and associated air emissions.
- Selective Catalytic Reduction (SCR) technology to control nitrogen oxide emissions (NO_X).
- Oxidation catalyst technology to control carbon monoxide emissions, and to reduce emissions of various toxic air contaminants.
- Optimized stack height to reduce ground-level concentrations of exhaust pollutants below public health-related significance thresholds.

Air quality and health risk data presented by CARB in the 2005 Almanac of Emissions and Air Quality for the San Diego Air Basin show that over the period 1990 through 2004, the average concentrations for the top ten toxic air contaminants (TACs) have been substantially reduced, and the associated health risks for the air basin are showing a steady downward trend as well. CARB-estimated emissions inventory values for the top ten TACs for 2004 and ambient levels and associated potential risks for 2004 are presented in Table 8.6-2 for the air basin.

8.6.4 Environmental Analysis

This public health section is organized to discuss the sources and different kinds of air emissions associated with construction and operation of the Project (see Section 8.1, Air Quality), the methodology used in health risk assessment, and the results of the assessment of potential health risks from the Project. Other potential public health risks associated with the Project are discussed in different sections of the AFC as follows:

- Potential exposure to wastes generated by the Project is discussed in Section 8.13, Waste Management.
- Potential exposure to the hypothetical accidental release of aqueous ammonia onsite or during offsite transport is discussed in Section 8.12, Hazardous Materials Handling.

TABLE 8.6-2
Top Ten Non-criteria Pollutants Emitted by All Sources in the San Diego Air Basin

		2004 Levels and Risks	
TAC	**Year 2004 Emissions (tons/yr)**	**Concentration (ppbv)**	**Potential Carcinogenic Risk (in 1 million)**
Acetaldehyde	508	0.89	4
Benzene	899	0.37	34
1,3-Butadiene	215	0.07	28
Carbon tetrachloride	0.12	0.09[a]	25[a]
Chromium 6	0.24	0.03 ng/m^3	5
Para-Dichlorobenzene	161	0.15	10
Formaldehyde	1,324	2.2	16
Methylene chloride	378	0.13	<1
Perchloroethylene	638	0.04	1
Diesel PM	1,527	1.4 µg/m^{3b}	420[b]

[a] Estimates are based on 2003 data (latest published)

[b] Estimates are based on 2000 data (latest published)

- Potential safety and health impacts relative to the work environment of Project employees are discussed in Section 8.7, Worker Health and Safety.
- Potential exposure to transmission line electric and magnetic fields is discussed in Section 5.5, Transmission Line Safety and Nuisance.

Project emissions to the air will consist of combustion by-products from the natural gas-fired turbines and duct burners in the HRSGs and in the auxiliary boiler. Another source of combustion pollutants will be the routine testing and maintenance of the diesel-fueled emergency fire water pump engine. After dispersion to ground-level, inhalation is the main pathway by which air pollutants can potentially cause public health impacts. Other pathways, including ingestion of soil and mother's milk, and dermal contact, also are evaluated for potential exposure. As discussed below, these health risks are not significant.

Construction and demolition emissions are presented in detail in Appendix 8.1F, followed by an air dispersion analysis that demonstrates ambient air quality standards will not be exceeded by the Project. The dominant emission with potential health risk is Diesel particulate matter from combustion of Diesel fuel in construction and demolition equipment (e.g., cranes, dozers, excavators, graders, front-end loaders, backhoes). A screening-type calculation in Section 5.4 of Appendix 8.1F demonstrates that the potential carcinogenic risk of Diesel particulate matter emissions during construction and demolition will be less than significant.

To evaluate potential health risks, the measures of these risks are first described in terms of the types of public health effects and the significance criteria and thresholds for those effects.

8.6.4.1 Significance Criteria

Significance criteria exist for both carcinogenic and non-carcinogenic risks, and are discussed separately.

8.6.4.1.1 Carcinogenic Risk

Carcinogenic or cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are assumed to have no threshold below which there would be no human health impact. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under state and SDAPCD regulations, an incremental cancer risk greater than 10-in-one million due to a project is considered to be a significant impact on public health. The 10-in-one-million risk level is also used by the Air Toxics "Hot Spots" (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

8.6.4.1.2 Non-Carcinogenic Risk

Non-carcinogenic or non-cancer health effects can be either long-term (chronic) or short-term (acute). In determining potential non-carcinogenic health risks from air toxics, it is assumed there is a dose of the chemical of concern below which there would be no impact on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-carcinogenic health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this health risk assessment, all hazard quotients were summed regardless of target organ.

This method leads to a conservative (upper bound) assessment. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated April 25, 2005 (see Appendix 8.1E).

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the duration of exposure is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. One-hour average concentrations are divided by acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposure to air toxics.

8.6.4.2 Construction and Demolition Impacts

Initial demolition (i.e., demolition of the LNG tank foundations) as part of site preparation activities and construction of the SBRP are expected to take approximately 28 months. During later, separate periods, demolition of the existing SBPP will be completed, and the SDG&E new substation will be constructed. No significant public health effects are expected during construction and demolition. Strict construction practices that incorporate safety and compliance with applicable LORS will be followed (see Section 8.6.5). In addition, mitigation measures to reduce air emissions from construction impacts will be implemented as described in Section 8.6.5.

Temporary air emissions from construction-related activities are discussed in Section 8.1.5.5, and a detailed emission inventory is presented in Appendix 8.1F. Ambient air modeling for PM_{10}, CO, SO_2 and NO_X was performed as described in Section 8.1.5.5 and Appendix 8.1F. Construction-related emissions are temporary and localized, resulting in no long-term significant impacts to the public.

Small quantities of hazardous waste may be generated during the construction and demolition phase of the project. Hazardous waste management plans will be in place so the potential for public exposure is minimal. Refer to Section 8.13 (Waste Management) for more information. No acutely hazardous materials will be used or stored on-site during construction (see Section 8.12, Hazardous Materials Handling). To assure worker safety during construction, safe work practices will be followed (see Section 8.7, Worker Safety).

8.6.4.3 Operations Impacts

Potential human health impacts associated with SBRP operations stem from exposure to air emissions from operation of the combined cycle units, auxiliary boiler, and routine testing of the emergency fire water pump engine. The non-criteria pollutants emitted from the Project include certain volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) from the combustion of natural gas, ammonia from the selective catalytic reduction (SCR) NOx control systems, and Diesel exhaust particulate matter (DPM) from combustion of Diesel fuel in the emergency fire water pump engine. These pollutants are listed in Table 8.6-3, and their emission rates are presented in Appendix 8.1E.

Emissions of criteria pollutants will not cause violations of the NAAQS or CAAQS as discussed in Section 8.1 (Air Quality). The Project will include BACT as required under SDAPCD rules. Contemporaneous emission reductions will be obtained from shutdown of the existing SBPP to sufficiently offset emissions of criteria pollutants from the Project, assuring that the Project will not result in an increase in total emissions. The Project is designed to keep ozone precursor emissions and PM_{10} precursor emissions at levels below recent historical levels at the SBPP (described in Appendix 8.1G).

TABLE 8.6-3
Pollutants Potentially Emitted to the Air from the SBRP

Criteria Pollutants	Non-criteria Pollutants (Continued)
Carbon monoxide	Formaldehyde
Oxides of nitrogen	Hexane
Particulate matter	Naphthalene
Oxides of sulfur	Propylene

TABLE 8.6-3
Pollutants Potentially Emitted to the Air from the SBRP

Criteria Pollutants	**Non-criteria Pollutants (Continued)**
Volatile organic compounds	Propylene oxide
	Toluene
Non-criteria (Toxic) Pollutants	Xylene
Ammonia	Hexane
Acetaldehyde	Polycyclic aromatic hydrocarbons (PAHs)
Acrolein	Benzo(a)anthracene
1,3-Butadiene	Benzo(a)pyrene
Benzene	Benzo(b)fluoranthene
Dichlorobenzene	Benzo(k)fluoranthene
Diesel Exhaust Particulate	Chrysene
Ethylbenzene	Dibenz(a,h)anthracene
	Indeno(1,2,3-cd)pyrene

Finally, air dispersion modeling results (see Section 8.1.5) show that Project emissions alone will not produce ambient concentrations of criteria pollutants that exceed ambient air quality standards. These standards are intended to protect the general public with a wide margin of safety. Therefore, the Project will not have a direct significant impact on public health from emissions of criteria pollutants.

The screening health risk assessment containing potential impacts associated with emissions of non-criteria pollutants to the air from the Project is presented in Appendix 8.1E. The risk assessment was prepared using guidelines developed by OEHHA, CARB and SDAPCD, and implemented in the latest version (1.2a) of the HARP model (Updated 8-26-05).

8.6.4.4 Public Health Impact Study Methods

Emissions of non-criteria pollutants from the Project were estimated using emission factors approved by the SDAPCD, CARB, and the U.S. Environmental Protection Agency (USEPA). Air dispersion modeling combines the emissions with site-specific terrain and meteorological conditions to estimate short-term and long-term arithmetic mean concentrations in air for use in the health risk assessment carried out with HARP Version 1.2a. Health risks potentially associated with the estimated concentrations of pollutants in air were characterized in terms of potential lifetime cancer risk (for carcinogenic substances), or comparison with reference exposure levels (RELs) for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the MIR (maximum impact receptor). This is also called the Maximum Incremental Cancer Risk (MICR). The hypothetical MEI is an individual assumed to be located at the MIR point (i.e., residential receptor) where the highest concentrations of air pollutants associated with facility emissions are predicted to occur, based on air dispersion modeling. Human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is assumed to be unlikely that there would be

significant impacts in any other location. The 1st highest concentration location represents the MIR.

Health risks potentially associated with concentrations of carcinogenic pollutants in air were calculated as estimated excess lifetime cancer risks. The inhalation excess cancer risk associated with the Project is calculated by the software from the ground-level concentration and inhalation cancer potency slope as follows:

$$ECR_{ij} = CONC_{ij} * ICPF_i * BR$$

where: ECR_{ij} = excess cancer risk from carcinogenic substance i at location j

$CONC_{ij}$ = ground-level concentration (in $\mu g/m^3$) of carcinogenic substance I at location j

$ICPF_i$ = inhalation cancer potency factor for carcinogenic substance i (in kg-day/mg)

BR = breathing rate (in L/kg-day)

The total carcinogenic risk at location j is found by summing the contributions from each carcinogenic substance i. The resulting ECR_j can be plotted over all calculated locations.

Evaluation of potential non-carcinogenic health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations in air with the RELs. An REL is a concentration in air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-carcinogenic effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB, 4/05), and are presented in Table 8.6-4.

TABLE 8.6-4
Toxicity Values Used to Characterize Health Risks

Compound	Inhalation Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)
Acetaldehyde	0.010	9.00	—
Acrolein	—	0.06	0.19
Ammonia	—	200	3,200
Benzene	0.10	60	1,300
1,3-Butadiene	0.60	20	—
Diesel PM	1.1	5.0	—
Ethylbenzene	—	2,000	—
Formaldehyde	0.021	3.0	94
Hexane	—	7,000	—
Naphthalene	0.12	9.0	—
PAHs (as BaP for HRA)	3.9	—	—

TABLE 8.6-4
Toxicity Values Used to Characterize Health Risks

Compound	Inhalation Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)
Propylene	—	3,000	—
Propylene oxide	0.013	30	3.100
Toluene	—	300	37,000
Xylene	—	700	22,000

Source: CARB/OEHHA, April 25, 2005.

8.6.4.5 Characterization of Risks from Toxic Air Pollutants

The estimated potential maximum carcinogenic risk associated with concentrations in air estimated for the MIR location is shown in Table 8.6-5. The maximum carcinogenic risk is well below the 10×10^{-6} threshold of significance.

TABLE 8.6-5
Summary of Potential Health Risks

Receptor	Carcinogenic Risk (per million)	Cancer Burden	Acute Health Hazard Index	Chronic Health Hazard Index
Maximum Incremental Cancer Risk (MICR) Location	1.0	0	0.09	0.02
Maximum Exposed Individual (MEI) (resident)	0.1	—	0.02	0.003
Maximum Exposed Worker (MEW)	0.02	—	0.008	0.001
Significance Level	10	1.0	1.0	1.0

Cancer risks potentially associated with facility emissions also were assessed in terms of cancer burden. Cancer burden is a hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the facility. Cancer burden is calculated as the worst-case product of any potential carcinogenic risk greater than 1 in one million and the number of individuals at that risk level. Because the maximum incremental cancer risk (MICR) is only 1 in one million, the potential cancer burden is essentially zero. If the potential MICR had substantially exceeded 1 in one million, then the worst-case estimate of cancer burden would have been calculated based upon the following assumptions.

The MIR concentration would have been applied to all affected portions of identified census tracts within the radius area defined by the distance to the 1st high (MIR) concentration. A detailed listing and map of affected census tracts and year 2000 population estimates would then have been provided in Appendix 8.1E. Figures would then have been presented in Appendix 8.1E to show the 1-, 2-, and 3-mile radius plots in relationship to the census tract

locations and site. This procedure, would it have been needed, results in a conservatively high estimate of cancer burden.

By definition, human health risks associated with emissions from the Project can not be higher elsewhere than at the location of the MIR. Therefore, the potential carcinogenic risk elsewhere also would be lower than the maximum listed in Table 8.6-5. Because the potential cancer burden listed in Table 8.6-5 is less than one, the emissions from the Project would not be associated with any increase in cancer cases in the previously defined population. In addition, the cancer burden is less than the Rule 1200 threshold value of 0.5. The methods that would have been used in this calculation considerably overstate the potential cancer burden, further supporting the conclusion that Project emissions would not cause a significant public health impact in terms of cancer risk.

The maximum potential acute non-carcinogenic hazard index associated with concentrations in air is shown in Table 8.6-5. The acute non-carcinogenic hazard index for all target organs fall below 1.0, the threshold of significance. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 8.1E.

Similarly, the maximum potential chronic non-carcinogenic hazard index associated with concentrations in air is shown in Table 8.6-5. The chronic non-carcinogenic hazard index falls below 1.0, the threshold of significance.

The estimates of carcinogenic and non-carcinogenic risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Because risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of carcinogenic risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that humans are as sensitive as the most sensitive animal species). Therefore, the true risk is not likely to be higher than risks estimated using inhalation cancer potency factors and is most likely lower, and could even be zero (USEPA, 1986; USEPA, 1996).

The analysis of potential cancer risk described in this section employs methods and assumptions generally applied by regulatory agencies for this purpose. Given the importance of protecting public health, these methods and assumptions are highly conservative. Conservative methodology and assumptions are as follows:

- The analysis includes representative weather data over a period of five years to assure that the least favorable conditions during one hour and one year producing the highest 1-hour and annual ground-level concentration of power plant emissions are used in the health risk assessment.
- The power plant is assumed to operate at hourly, daily, and annual emission conditions that produce the highest ground-level concentrations.

- The location of the highest ground-level concentration of power plant emissions is identified and the analysis then assumes that a sensitive individual is at this location constantly over the entire 70-year period.

Taken together, these methods and assumptions create a scenario that can not exist in the real world. For example, if the worst case weather conditions occur on a winter evening, but the worst case emission rates occur on a summer afternoon, the analysis nonetheless assumes that these events occur at the same time. The point of using these unrealistic assumptions is to consciously overstate the potential impacts. No one will experience exposures as great as those assumed for this analysis. By determining that even this highly overstated exposure will not be significant, the analysis enables a high degree of confidence that the much lower exposures that actual persons will experience will not result in any significant increase in cancer risk. In short, the analysis ensures that there will not be any significant public health impacts at any location, under any weather condition, under any operating condition.

8.6.4.6 Hazardous Materials

Hazardous materials will be used and stored at the facility. The hazardous materials stored in significant quantities on-site and descriptions of their uses are presented in Section 8.12. Use of chemicals at the proposed facility will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant impacts to public health. While mitigation measures will be in place to prevent releases, if an accidental release migrated offsite, potential impacts to the public could result.

The California Accidental Release Program (CalARP) regulations and Code of Federal Regulations (CFR) Title 40 Part 68 under the Clean Air Act establish emergency response planning requirements for acutely hazardous materials. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program listed hazardous material. RMP listed materials proposed to be used at the facility include aqueous ammonia as discussed in Section 8.12.

An offsite consequence analysis was performed to assess potential risks to offsite human populations if a spill or rupture of one of the two aqueous ammonia storage tanks were to occur. The results of this analysis presented in Section 8.12 show that offsite ammonia concentrations do not exceed the CEC's 75 parts per million significance threshold; therefore, no significant public health impacts are expected.

8.6.4.7 Operation Odors

A small amount of ammonia used to control oxides of nitrogen (NO_x) emissions can "slip" past the SCR catalyst and be emitted from the exhaust stack, but this amount is less than that required to produce an odor offsite. The expected exhaust gas ammonia concentration, known as ammonia "slip," will be less than 10 parts per million by volume (ppmv). After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppmv that the Compressed Gas Association has determined to be acceptable, as well as being below the ACGIH[5] TLV[6] and STEL[7] values of 25 and

5 American Congress of Government Industrial Hygienists

35 ppm respectively (adopted 2003). Therefore, potential ammonia emissions would not create a significant odor. Other combustion contaminants are not present at concentrations that could produce a significant odor.

8.6.4.8 Electromagnetic Field Exposure

Except for a new 4,001 230 kV overhead segment, the existing electric transmission lines are not part of the Project. The Project will include additional electric power handling transformers and associated equipment in a relocated substation as described in Section 2.0, and in more detail in Section 5.0. The Project electric power handling equipment does not travel through residential areas, and based on recent findings of the National Institute of Environmental Health Sciences (NIEHS 1999), electromagnetic field exposures would not result in a significant impact on public health. The NIEH report to the U.S. Congress found that "the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm (NIEH 1999)."

8.6.4.9 Summary of Impacts

Results from the screening health risk assessment based on emissions modeling indicate that there will be no significant incremental public health risks from construction, demolition or operation of the proposed project. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of NO_2, CO, SO_2, and PM_{10} would not exceed ambient air quality standards, which protect public health with a margin of safety for the most sensitive subpopulations (Section 8.1.5).

8.6.5 Mitigation Measures

No public he3alth related mitigation measures are needed for the Project air emissions because the potential air quality and public health impacts are less than significant.

8.6.6 Involved Agencies and Agency Contacts

Table 8.6-6 provides contact information for agencies involved with public health.

6 Threshold Limit Value

7 Short-Term Exposure Level

TABLE 8.6-6
Summary of Agency Contacts for Public Health

Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Public exposure to air pollutants	USEPA Region 9	Gerardo Rios USEPA Region 9 75 Hawthorne Street San Francisco, CA 94105 (916) 972-3974
	CARB	Mike Tollstrup Project Assessment Branch California Air Resources Board 1001 I Street Sacramento, CA 95812 (916) 323-8473
	San Diego Air Pollution Control District	Tom Weeks Chief, Engineering Division 10124 Old Grove Road San Diego, CA 92131 (858) 586-2715
Public exposure to chemicals known to cause cancer or reproductive toxicity	Cal-EPA, Office of Environmental Health and Hazard Assessment (OEHHA)	Cynthia Oshita or Susan Long Office of Environmental Health Hazard Assessment 1001 I Street, Sacramento, CA 95814 (916) 445-6900
Public exposure to accidental releases of hazardous materials	USEPA Region 9	Deborah Jordan USEPA Region 9 75 Hawthorne Street San Francisco, CA 94105 (916) 947-4157
	California Office of Emergency Services	Moustafa Abou-Taleb Governor's Office of Emergency Services 3650 Schriever Avenue Mather, CA 95655 (916) 845-8741
	San Diego County Department of Environmental Health	Matt Trainor County of San Diego Department of Environmental Health Administrative Offices 1255 Imperial Avenue, 3rd Floor San Diego, CA 92101 (619) 338-2372

8.6.7 Permits Required and Schedule

Agency-required permits related to public health include a Risk Management Plan for hazardous materials, and the San Diego Air Pollution Control District Determination of Compliance (DOC). Upon approval of the project by the CEC, the DOC serves as the District Authority to Construct. A Permit to Operate will be issued by the SDAPCD after construction and commencement of operation. These requirements are discussed in detail in Sections 8.1 (Air Quality) and 8.12 (Hazardous Materials Handling).

8.6.8 References

ARB. *Consolidated table of OEHHA/ARB approved risk assessment health values*. (http://arbis.arb.ca.gov/toxics/healthval/contable.pdf), August 25, 2005.

ARB. HARP Model, Version 1.2a, August 26, 2005.

OEHHA. 2003. *Air Toxics Hot Spots Program Risk Assessment Guidelines, Guideline The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments s*, CalEPA, August 2003.

National Institute of Environmental Health Sciences. Environmental Health Institute report concludes evidence is 'weak' that EMFs cause cancer. Press release. National Institute of Environmental Health Sciences, National Institutes of Health, 1999.

SDAPCD. *Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs),* March 2005.

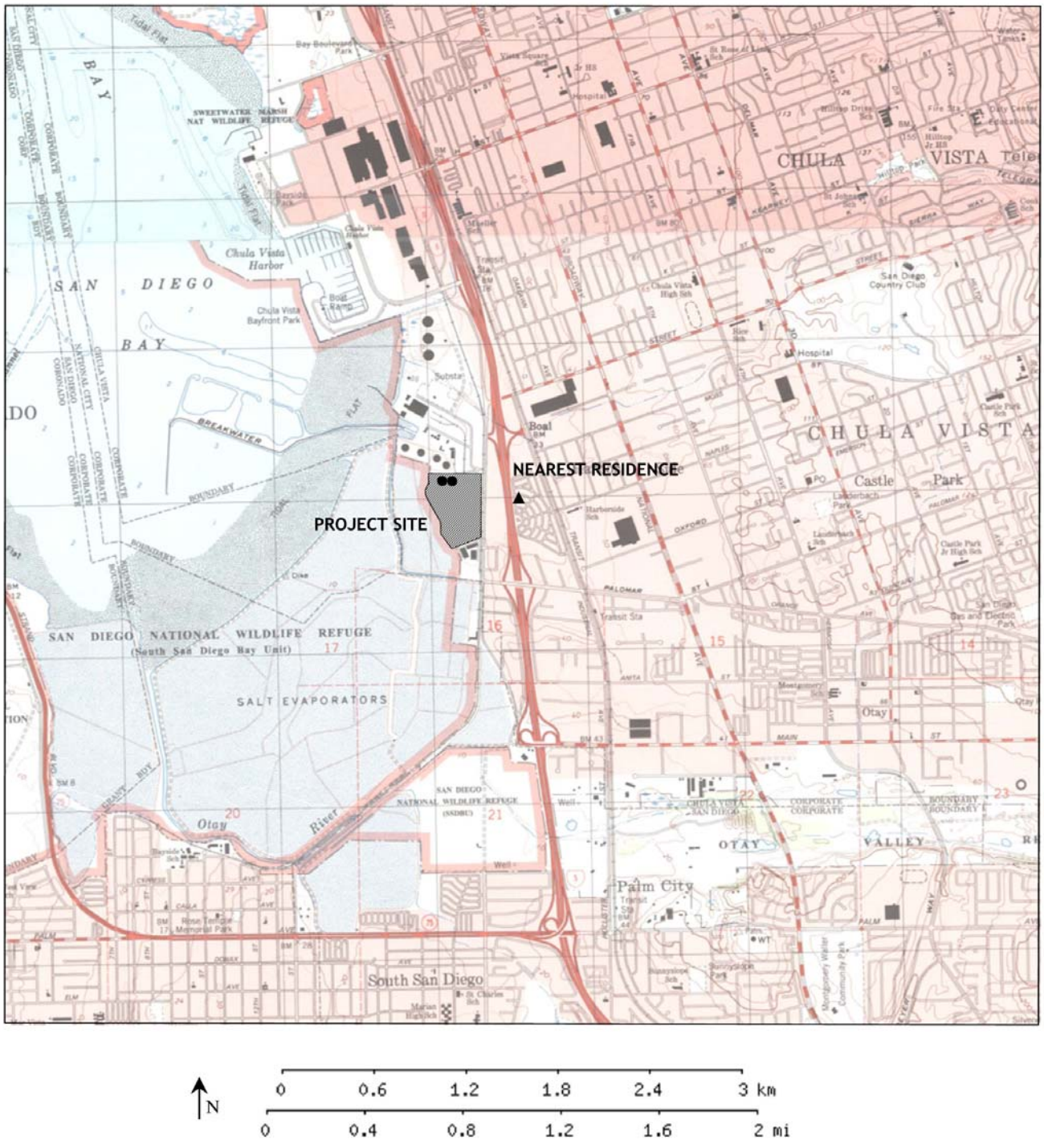

FIGURE 8.6-1
Nearest Residential Receptor

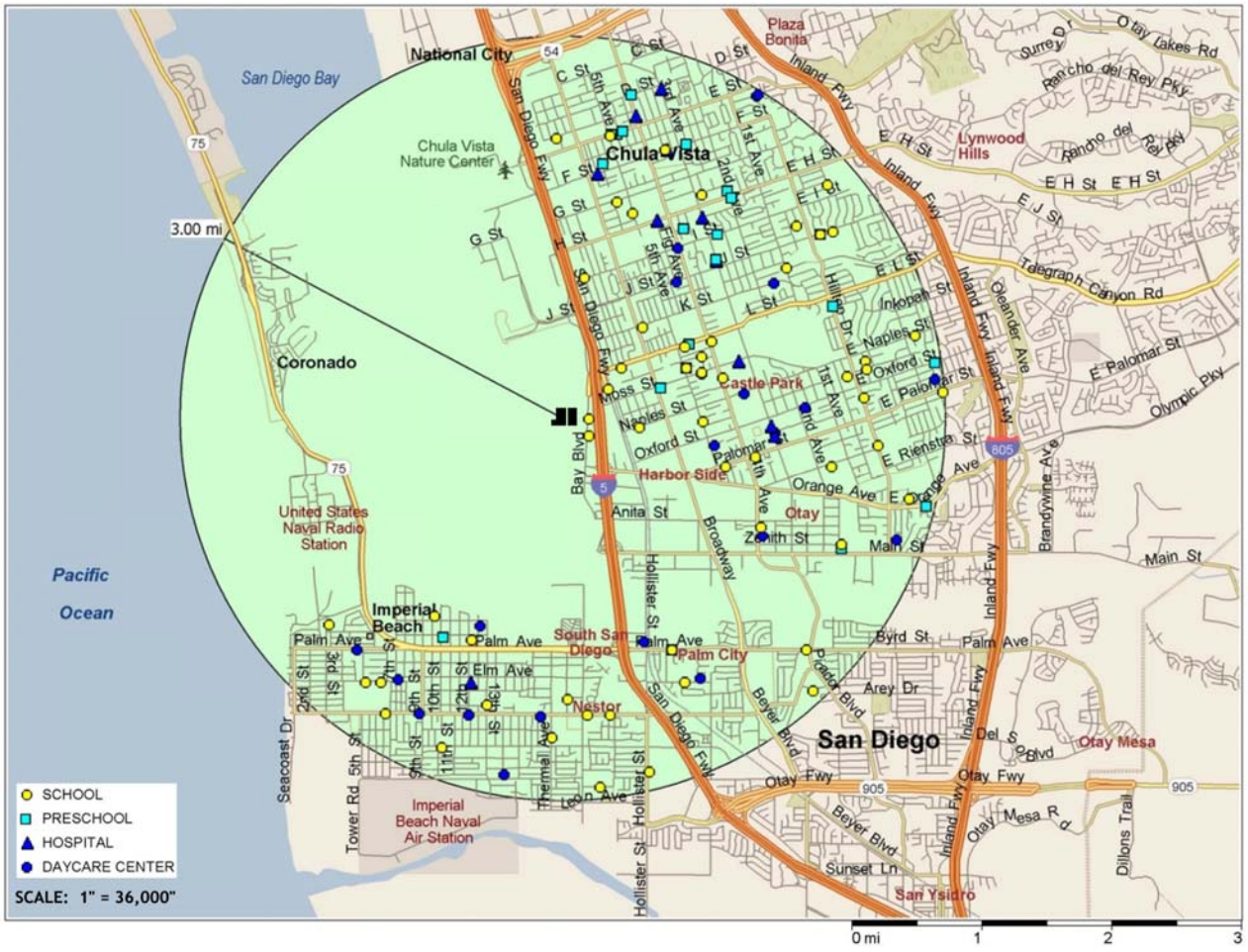

FIGURE 8.6-2
Location of Sensitive Receptors

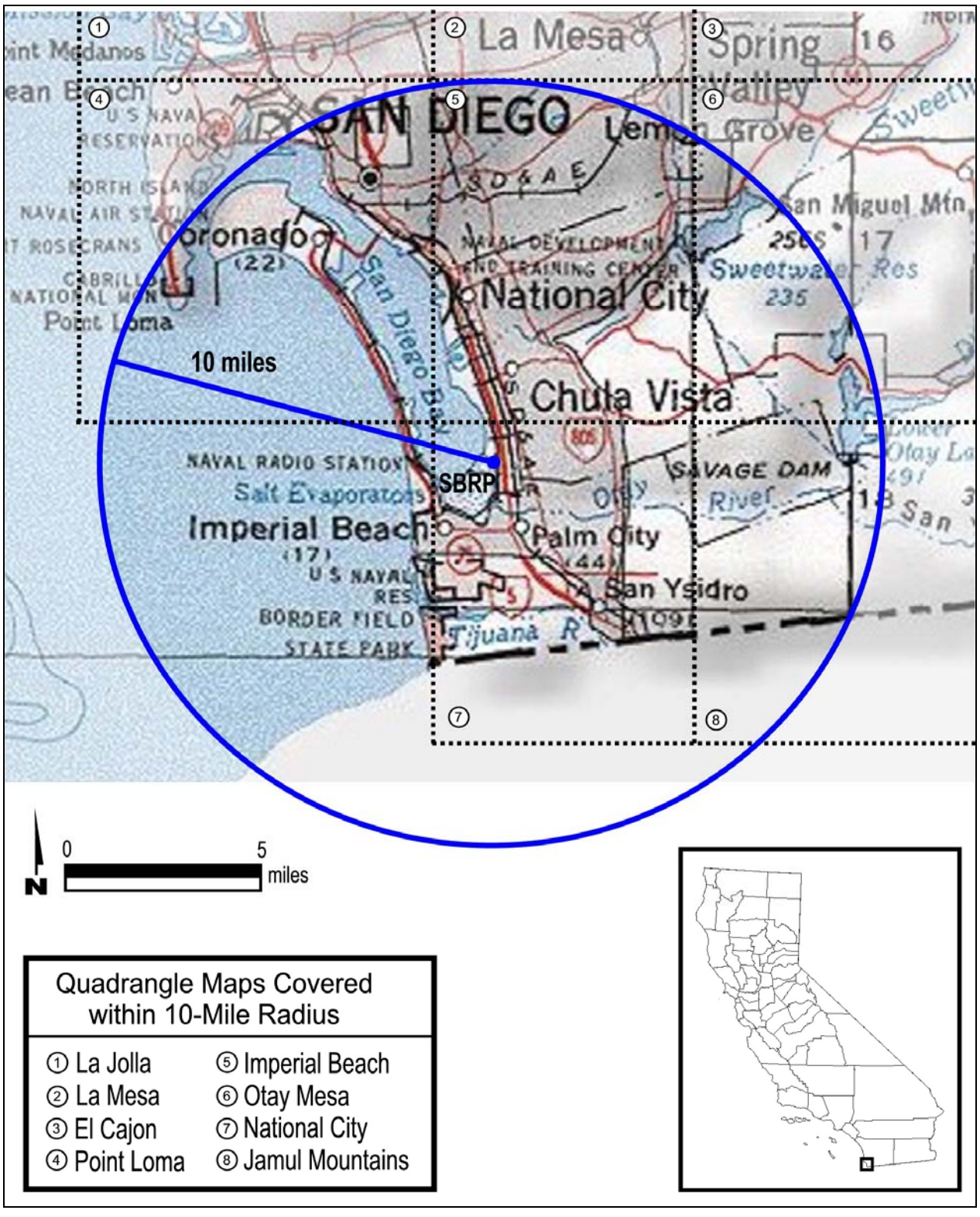

FIGURE 8.6-3
General Map of Terrain within 10 miles of SBRP8

8 USGS quadrangle maps are included in Appendix 8.6B